

Basic Learning Points:

Tier 4 – Post-Construction Studies and Reporting



- 1) Information gathered in Tiers 1, 2, and 3 will inform the duration and level of effort for Tier 4 studies.
- 2) Tier 4 studies assess whether predictions of fatality risk and direct and indirect impacts to habitat were correct.
- 3) Tier 4a – Fatality studies protocol design considerations:
 - a. Duration and frequency of monitoring
 - b. Number of turbines to monitor
 - c. Delineation of carcass search plots, transects, and habitat mapping
 - d. Field bias and error assessment
 - e. Estimators of fatality
- 4) Tier 4b – Assessing direct and indirect impacts of habitat loss, degradation and fragmentation. Tier 4b studies should be conducted if Tier 3 studies indicate:
 - a. the presence of species of habitat fragmentation concern, or
 - b. significant direct and indirect adverse impacts to species of concern.
- 5) From Manuela Huso's fatality estimator presentation:
 - a. The number of carcasses found does not equal the number of dead individuals.
 - b. Detection rates vary among species and individual carcasses.

- c. Need to do test trials to estimate searcher efficiency and carcass persistence.
 - d. Carcass density is not constant within a search plot surrounding a turbine.
 - e. All estimates need an associated measure of uncertainty
 - f. Remember that several estimators of fatality are available, but they have different assumptions.
- 6) Communication is still key – communication is more than just casual chatting; it includes documentation by both the operator and the Service of conversations, communications, meetings, decisions made, study results, and adaptive management options. It includes sharing with the Service information, study and monitoring results, and adaptive management actions undertaken by a company. Effective communication leads to collaboration which should effectively inform mitigation measures at the current facility and lead to more efficient decisions at future facilities.
- 7) Role of the U.S. Fish and Wildlife Service Office of Law Enforcement (OLE) – in the context of industry, Law Enforcement is broader than enforcement and prosecution. Special Agents with OLE follow a standard enforcement model in dealing with industries (including wind power) whose operations take protected species. Under this model, agents investigate and document take of protected species and a company's administrative record; provide notice of a problem and the laws implicated; encourage compliance and allow an opportunity to correct, including recommending companies seek available permits; and weigh a company's history from siting and design decisions, to communications with involved government agencies, to implementation of Service recommendations to avoid problems and adaptive management to address problems, if any; before pursuing legal action and seeking criminal or civil penalties as appropriate for a particular company.
- 8) Reporting – reporting fatalities should follow an agreed upon protocol that can be used by both the operator and the Service. The protocol

should be discussed as early as possible in the development process and include how and to whom the operator will report fatalities. Reporting may be associated with a permit to remove bird carcasses or totally separate from a permit, depending on the project. Up-front communication of fatalities allows for prompt evaluation of issues and potential identification of solutions.

- 9) Remember, post-construction monitoring can serve several purposes, including:
 - a. Documenting and reporting numbers of dead animals;
 - b. Assessing the accuracy of pre-construction monitoring; and,
 - c. Adaptively manage to reduce or eliminate take at current and future sites.
- 10) Tier 4 is post-construction and assesses the accuracy of the predictions of fatality risk and direct/indirect impacts to habitats.
- 11) Tier 5 studies will not be necessary for most wind energy projects. Tier 5 studies are intended to:
 - a. analyze factors associated with impacts in those cases in which Tier 4 analyses indicate they are potentially significant;
 - b. identify why mitigation measures implemented for a project were not adequate; and
 - c. assess demographic effects on the local populations of species of concern when demographic information is important, including species of habitat fragmentation concern.